

GB/04/03134

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INVESTOR IN PEOPLE

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Newport  
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I also certify that the attached copy of the request for grant of a Patent (Form 1/77) bears an amendment, effected by this office, following a request by the applicant and agreed to by the Comptroller-General.

In accordance with the Patents (Companies Re-registration) Rules 1982, if a company named in this certificate and any accompanying documents has re-registered under the Companies Act 1980 with the same name as that with which it was registered immediately before re-registration save for the substitution as, or inclusion as, the last part of the name of the words "public limited company" or their equivalents in Welsh, references to the name of the company in this certificate and any accompanying documents shall be treated as references to the name with which it is so re-registered.

In accordance with the rules, the words "public limited company" may be replaced by p.l.c., plc, P.L.C. or PLC.

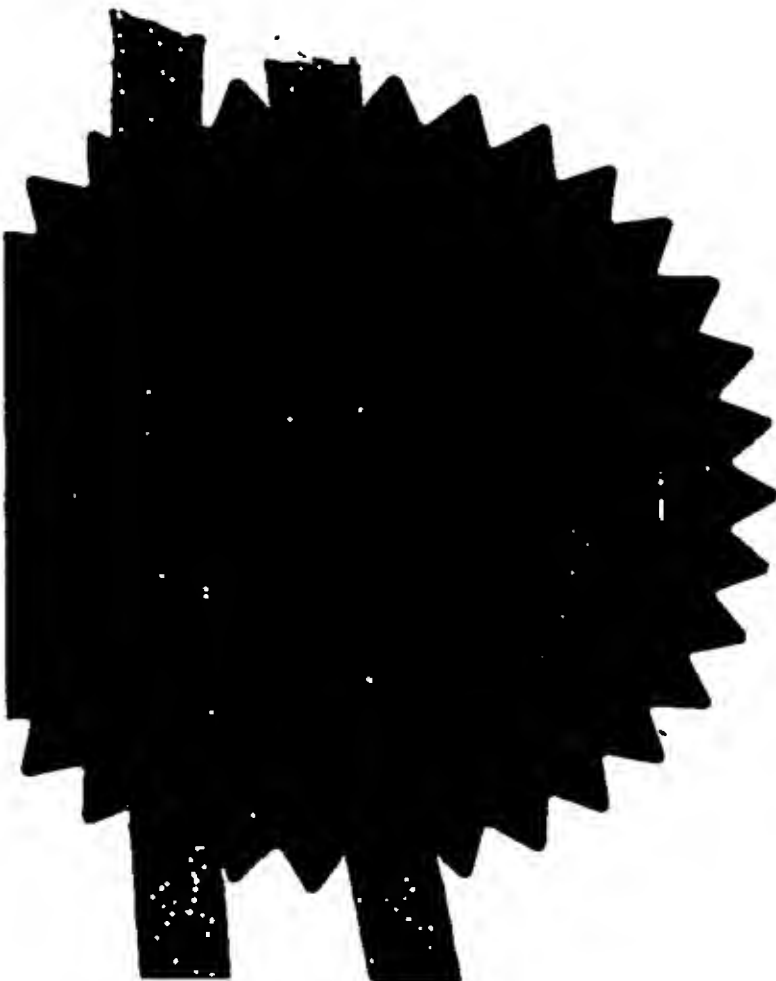
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Signed

*AmBrewster*

Dated 9 August 2004

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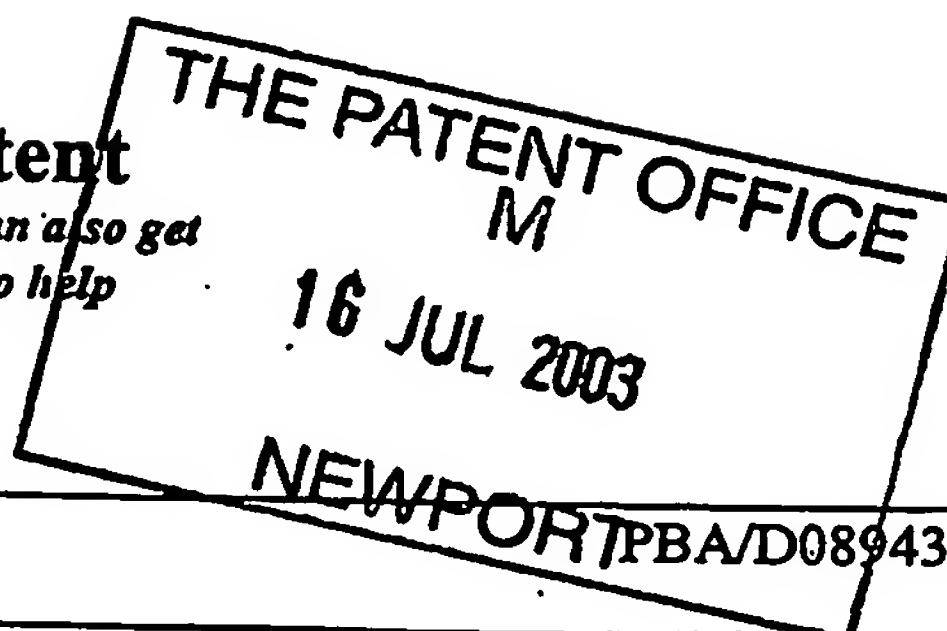


# The Patent Office

16 JUL 03 E822869-2 000354  
P01/7700 0.00-0316574.3

## Request for grant of a patent

(see the notes on the back of this form. You can also get an explanatory leaflet from the Patent Office to help you fill in this form)



The Patent Office

Cardiff Road  
Newport  
Gwent NP9 1RH

1. Your reference  
2. Patent application number  
(The Patent Office will fill in this part)  
0316574.3 16 JUL 2003

3. Full name, address and postcode of the or of each applicant (underline all surnames)  
THE UNIVERSITY OF WALES, BANGOR  
THE BIOCOMPOSITES CENTRE  
BANGOR  
GWYNEDD  
LL57 2UW  
Patents ADP number (if you know it) 7500 416 001  
If the applicant is a corporate body, give the country/state of its incorporation UNITED KINGDOM

4. Title of the invention  
RECYCLING OF WOOD BASED PANELS

5. Name of your agent (if you have one)  
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)  
Patents ADP number (if you know it)  
Marks & Clerk  
Sussex House  
83-85 Mosley Street  
Manchester  
M2 3LG  
18004  
Boult Wade Tennant  
Verulam Gardens  
70 Grays Inn Road  
London  
WC1X 8BT  
42001

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number  
Country Priority application number Date of filing  
(if you know it) (day/month/year)

7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application  
Number of earlier application Date of filing  
(day/month/year)

8. Is a statement of Inventorship and of right to grant of a patent required in support of this request? (Answer 'Yes' if:  
a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
See note (d))

YES

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9. Enter the number of sheets for any of the following items you are filing with this form. Do not count copies of the same document

Continuation sheets of this form

Description

1

Claim(s)

1

Abstract

1

Drawing(s)

10. If you are also filing any of the following, state how many against each item.

Priority documents

Translations of priority documents

Statement of Inventorship and right to grant of a patent (*Patents Form 7/77*)

Request for preliminary examination and search (*Patents Form 9/77*)

Request for substantive examination (*Patents Form 10/77*)

Any other documents  
(Please specify)

11.

I/We request the grant of a patent on the basis of this application.

Signature..... Date 15 July 2003

MARKS & CLERK

12. Name and daytime telephone number of person to contact in the United Kingdom

P.B. ATKINSON - 0161 233 5824

### Warning

After an application for a patent has been filed, the Comptroller of the Patent Office will consider whether publication or communication of the invention should be prohibited or restricted under Section 22 of the Patents Act 1977. You will be informed if it is necessary to prohibit or restrict your invention in this way. Furthermore, if you live in the United Kingdom, Section 23 of the Patents Act 1977 stops you from applying for a patent abroad without first getting written permission from the Patent Office unless an application has been filed at least 6 weeks beforehand in the United Kingdom for a patent for the same invention and either no direction prohibiting publication or communication has been given, or any such direction has been revoked.

### Notes

- If you need help to fill in this form or you have any questions, please contact the Patent Office on 0645 500505.
- Write your answers in capital letters using black ink or you may type them.
- If there is not enough space for all the relevant details on any part of this form, please continue on a separate sheet of paper and write "see continuation sheet" in the relevant part(s). Any continuation sheet should be attached to this form.
- If you have answered 'Yes' Patents Form 7/77 will need to be filed.
- Once you have filled in the form you must remember to sign and date it.
- For details of the fee and ways to pay please contact the Patent Office.

## **Recycling of wood based panels**

This invention relates to a method for the breakdown, through the employment of microwaves, of organic and / or inorganic resin or other adhesive bonds to enable the liberation of fibres and particles of wood and / or other materials from manufactured products to enable recycling, re-use or recovery of the fibres and particles and / or resin and other adhesive components.

The microwaves, in the range of frequencies from  $896 \pm 20\text{MHz}$  to  $2450 \pm 25\text{MHz}$ , are generated by a magnetron. The power output to the cavity (in the form of a metallic vessel or pipe) is in the range 500W to 30kW. The microwaves propagate through the cavity containing wood based panels, surrounded by water, in the density range  $200\text{Kg/m}^3$  to  $1200\text{Kg/m}^3$ .

The microwaves penetrate the material surface thereby heating it, causing water to be absorbed leading to swelling of the material. This in turn leads to the disruption of the resin (adhesive) bonds therefore liberating the wood fibres/particulates. The process may be undertaken in either batch or continuous modes with the wood panels being 'turned' to ensure uniform microwave exposure. The wood panels may be subject to pre-treatment in the form of vacuum impregnation, allowing water up-take. This will enable easier liberation of wood fibres/particulates. Additives may be added to the water to enhance the quality of recovered material.

## Claims

1. A method of liberating fibres and particles from wood panels with densities of  $200\text{Kg/m}^3$  to  $1200\text{Kg/m}^3$  by the application of microwaves in the frequency range  $896 \pm 20\text{MHz}$  to  $2450 \pm 25\text{MHz}$ , generated by a magnetron. The power input to the cavity being in the range 500W to 30kW. The panels may be immersed in water the process may be operated in the batch process mode.
2. As claim 1, but the wood panels being subjected to RF (radio frequency) as opposed to microwaves.
3. As claims 1 and 2, but with wood panels pre-coated with paper, foil, melamine, veneer or any other finish commonly found on board material.
4. As claims 1, 2 and 3, but with the addition of chemical additives to the surrounding water.
5. As claims 1, 2, 3, and 4, but operated in a continuous process format.
6. As claims 1, 2, 3, 4, and 5, but with the heat produced as a by-product of the process being utilised for the drying purposes.
7. As claim 6, but with the heat being utilised in a continuous mode.
8. As claim 6, but with the heat being utilised in a non-continuous mode.

## **Abstract**

### **Recycling of wood based panels**

A process for the recycling, re-use or recovery of the fibres and / or binding resins, the constituents of wood panels, by the application of microwave radiation. The wood panels, of varying densities, may be contained in a water while being exposed to microwaves within the confines of a cavity (metallic vessel or pipe). Pre-treatment employing use of vacuum impregnation may be required to make wood fibre and / or wood particles easier to liberate. Additives may be added to the water to enhance the quality of recovered material.